ESSEX COUNTY
HAVERHILL, MASSACHUSETTS

LAKE SALTONSTALL OUTLET
MA-00164

NATIONAL DAM INSPECTION PROGRAM
CORPS OF ENGINEERS

LAKE SALTONSTALL OUTLET

Identification No.: MA 00164

Stream: Tributary of Merrimack River

Town: Haverhill

County and State: Essex County, Massachusetts

The dam at Lake Saltonstall is an earth embankment and stone masonry structure. Its dimensions are 6 feet high by 80 feet long. The only known outlet is a gated intake structure which is connected to a storm drainage system and discharges at the Merrimack River, about a half mile downstream.

According to Corps Guidelines, the dam has a small size classification and a low hazard potential. The maximum failure discharge would be about 190 cfs. Field survey information shows that the top of dam is at elevation 121±. The access road near Mill Street has a low elevation of 118.67±. Therefore, water in the Lake below elevation 118.67 cannot be discharged due to dam failure. The access road acts as a dam to retain the failure outflow.

The 190 cfs failure outflow, which overflows the access road, will flow along Mill Street towards Route 97 and the Merrimack River. Flood depths on Mill Street will be about 0.75 feet. At Route 97, the flood depth will decrease substantially as the flood impact area increases.

Residential structures along Mill Street are about 3 to 4 feet higher than the road level and will not be damaged by flood

water. At Route 97, there are several businesses which could receive minor flood (less than 1 foot deep) damage. Loss of life is not apparent.


PROJECT LOCATION
Haverhill Country Club
Frye Pond
Ayers Hill
Whittier Birthplace
INTERCHANGE 40
INTERCHANGE 39
Haverhill Airport
Whittier Sch
Walnut Square Sch
Lake Pentucket
Kenoza Lake
WINNEKENNI PARK
Northern Essex Community College
Pumping Sta
Hillside Cem
St James Sch
Fox Sch
Merrimack Sch
Burnham Sch
Lake Saltonstall
HAVERHILL
Playground
St Joseph Sch
Passaqua Playground
MERRIMACK
Bradford
Sacred Hearts Sch
Cogswell Sch
Bradford College
Elmwood Cem
Peabody Sch
Fire Sta
Wood Sch
Hunking Sch
Lithuanian Cem
Bradford Country Club
Linwood Cem
Nettle Sch
Hale Hospital
Golden Hill
Playground
Riverside
Glynn Memorial Hospital
Haverhill Stadium
Riverside Park
Hales Island

PHOTO NO. 1 - Upstream view of Lake Saltonstall Dam. The intake structure with intake screen, is at the center of the photo. This is the only known inlet. This structure outlets to a drain line in adjacent service road.

PHOTO NO. 2 - View of downstream face of Dam. The Dam is about 6 ft. high and 80 ft. long. It is an earth embankment, stone masonry structure. The top elevation of the Dam is 121±.

PHOTO NO. 3 - This photo shows the immediate downstream area and service road. The "low" area to the right acts as a retention area. Drainage outlet, if any from this area, is unknown. Mill Street can be seen at the end of the access road. The access road's lowest elevation is 118.67, about 2.33 ft. below the top of Dam, at this location.

PHOTO NO. 4 - This photo was taken at the intersection of the access road and Mill Street (Sta. 6+00). The elevation of the access road (foreground) is 118.67. The elevation of Mill street at center of photo near location of cars, is 110±. Bordman Street comes into this intersection from the left, near the cemetery. Flood depth in this area will be about 1.2 ft. All inhabitable structures are above this level.

PHOTO NO. 5 - This photo was taken at the intersection of Mill and Bordman Streets (Sta. 11+00). It was taken looking south along Mill Street. All habitable structures are above the street level by several feet. Flood depth here is about 0.75 ft.

PHOTO NO. 6 - This photo (Sta. 16+00) was taken at Mill and Summer Streets. Here again, there are no habitable structures within 3 ft. of the road level. Flood depth is about 0.75 ft. The intersection at Route 97 (Sta. 24+00) and the Merrimack River (Sta. 26+00) can be seen at the center of the photo.

PHOTO NO. 7 - This shows the intersection of Route 97 and Mill Street, looking to the east. River Street enters from the right side. Water depth here will be 0.75 ft. and less as it begins to flow onto Route 97 and River Street. Flood damage at these structures would be limited to some flooding of first floor areas. Possible loss of life not indicated as flood water depth should be reduced to 6 inches or less as the flood water impact area increases.

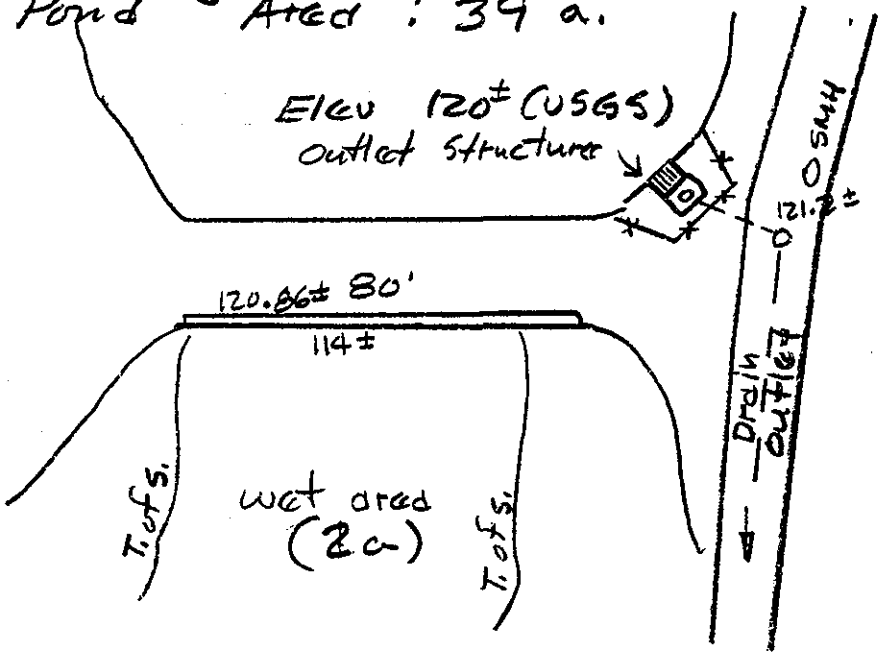
JOB NO. 79.206.12
DATE 12-12-79
BY MA
CH'D BY FDD

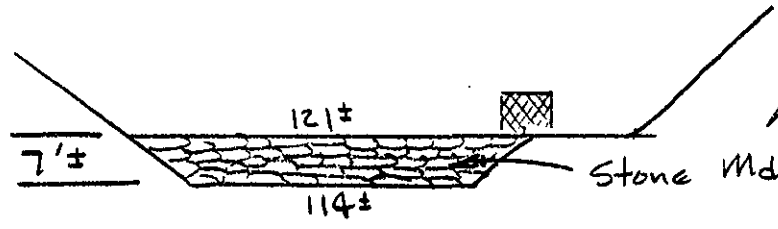
HH&B HAYDEN, HARDING & BUCHANAN, INC.
CONSULTING ENGINEERS
BOSTON — WEST HARTFORD

SHEET NO. 1
JOB DAMS
SUBJECT Saltonstall
CLIENT COE

Lake Saltonstall Outlet

Drainage Area: 228± a or 0.36 s.m.
Pond Area: 39 a.





Max Storage = 6x39
= 234 ± a-f

FAILURE OUTFLOW

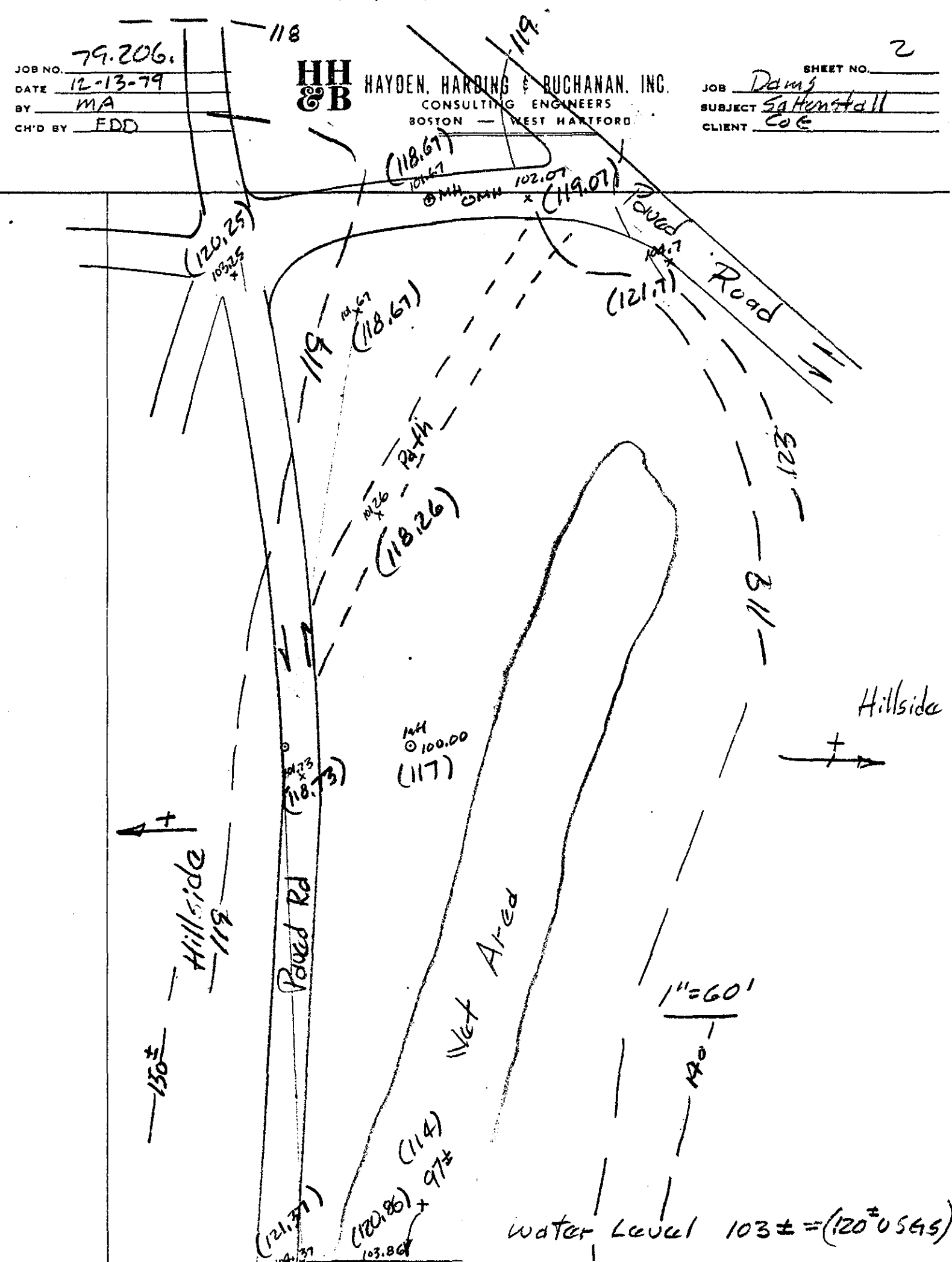
$$Q = \frac{8}{27} \times (0.4 \times 80) \times \sqrt{32.2} \times (2.33)^{1.5} = 190 \pm \text{cfs}$$

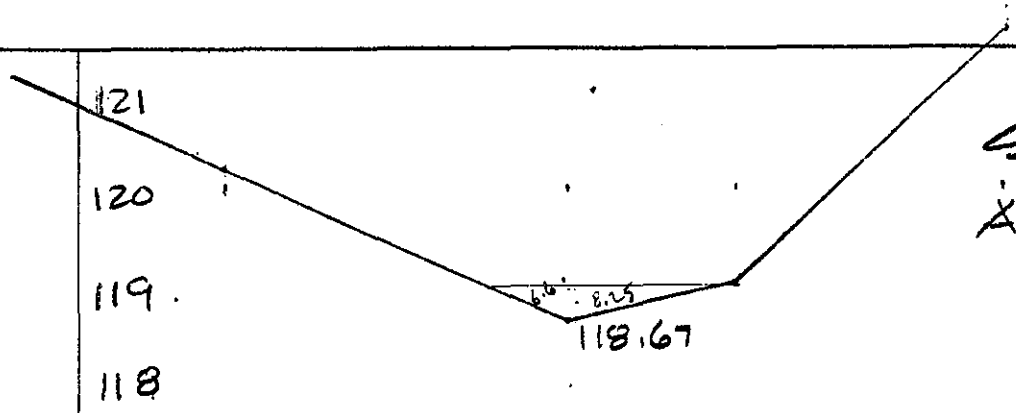
Dam cannot fail & discharge water below the road (Sta 6+00) elev of 118.67.

JOB NO. 79.206.
DATE 12-13-79
BY MA
CH'D BY FDD

HH&B HAYDEN, HARDING & BUCHANAN, INC.
CONSULTING ENGINEERS
BOSTON — WEST HARTFORD

SHEET NO. 2
JOB Dams
SUBJECT Sa Hemstall
CLIENT CoE

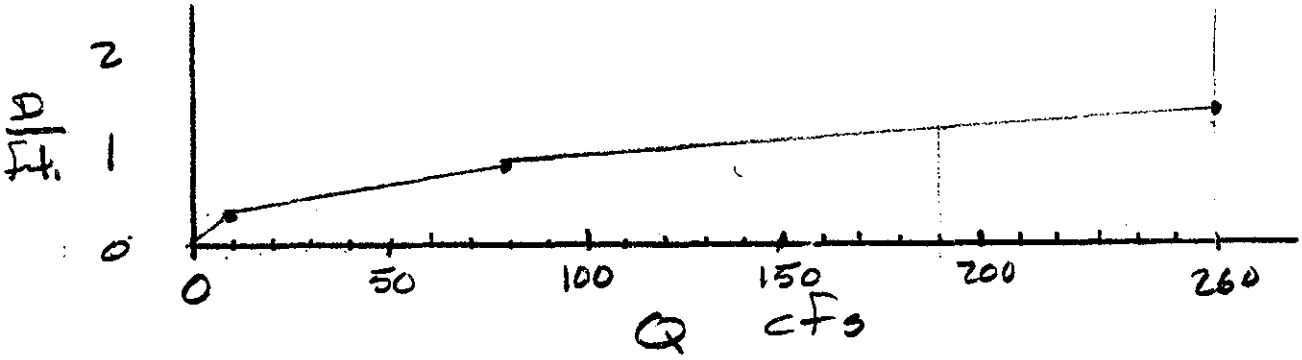




Std 6+00
At Roadway

$$V = \frac{1.486}{0.035}(R^{2/3})(0.0038)^{1/2} = R^{2/3}(2.65)$$

D	WP	Area	$R^{2/3}$ (2.65)	V	Q
0.33	70'	12 sf	0.31	"	0.81 fps	10 cfs
0.83	120'	52 "	0.57	"	1.51	79
1.33	170'	120 "	0.79	"	2.1	260
2.33	265	340	1.18	"	3.13	1064



Sta 6+00

Water Stored in Pond at time of failure = 91 ± a-f (depth = 2.33')

Water ~~Stored~~ behind roadway ≃ 2 a-f / ft.

Q_{P_1} = 190 cfs El_1 = 1.2

Sto_1 = 1.2 × 2 = 2.4

$Q_{P_2} = 190 \cdot \left(1 - \frac{2.4}{91.}\right) = 185.$ cfs

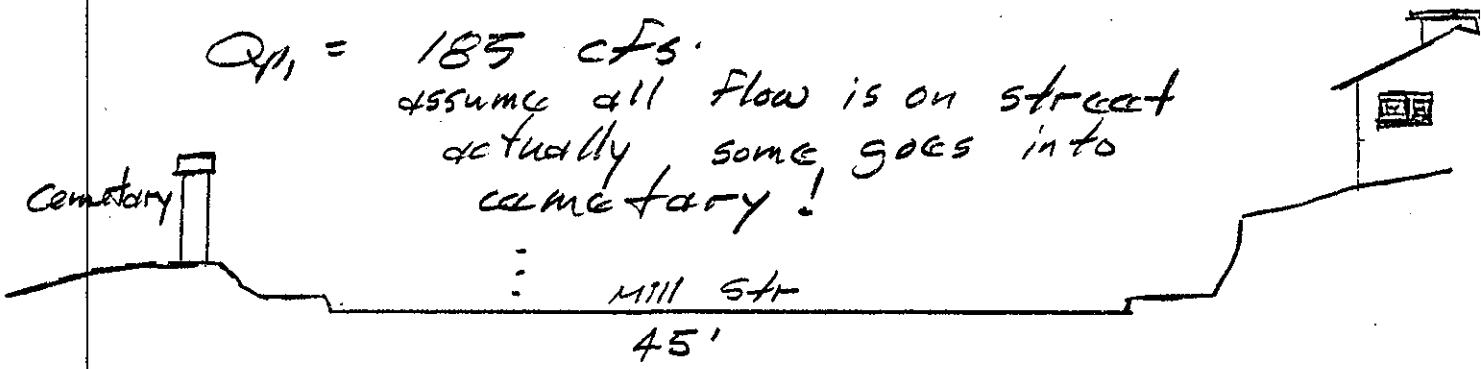
El_2 = 1.2 ±

Q_{P_3} = 185 cfs Elev = 120 ±

at Sta 6+00.

Sta 11+00

Q_{p_1} = 185 cfs.
assume all flow is on street
actually some goes into
cemetary!



$S = \frac{118.67-110}{500} = 0.01734$.

$V = \frac{1.486}{0.035} R^{2/3} (.01734)^{1/2} = R^{2/3} (5.591)$

D / F	WP / F	A / SF	$R^{2/3}$ / —	(5.591) / —	V / FPS	Q / CFS
1	52	53	1.01	"	5.65	299
0.5	46	22.5	0.62	"	3.46	78

Q_{p_1} = 185 E_1 = 0.75 Sta I = 0.8-a-f

$Q_{p_2} = 185 \left(1 - \frac{0.8}{91}\right) = 183$ cfs

$E_2 \simeq 0.75'$

Q_{p_3} = 185 cfs Elev ≃ 110.75±
no effect storage reduction

Sta 26+00

Flow section effectively same as sta 6+00.

$Q_{P_1} = 183 \quad El_1 = 0.75 \quad Stor_1 = 2.63$ a-f

$Q_{P_2} = 183\left(1 - \frac{2.63}{91}\right) = 178$ cfs

$El_2 = 0.75 \pm \quad Stor_2 = 2.53$

$Q_{P_3} = 183\left(1 - \frac{2.58}{91}\right) = 178$ cfs

$D = 0.75$ ft $\pm$

Water will flow across intersection 0.75 ft. deep (max) or less. It will flow along route 97 & river street.

Gould/wpc/313

NEDED-E

20 August 1981

City of Haverhill
City Hall
Haverhill, MA 01830

Gentlemen:

Inclosed for your use is a copy of the Report on Lake Saltonstall Outlet (MA-00164). During the field inspection and the early stages of the preparation of this report, our contractor found that this dam had a "low potential hazard" for downstream damage in the event of a failure. Based on this finding, we directed our contractor to terminate his work and summarize the work accomplished to date. The report inclosed is a copy of this summary.

If you have any questions concerning this report, we suggest you contact the Commonwealth of Massachusetts, Department of Environmental Quality Engineering first; then if there are further questions contact Mr. Gould, Project Management Branch, Engineering Division of this office at (617) 894-2400, extension 313.

Sincerely,

Incl
as stated

JOE B. FRYAR
Chief, Engineering Division

CF: Mr. Gould
Eng Div Files 112S

Gould/wpc/313

NEDED-E

20 August 1981

Mr. Anthony D. Cortese, Commissioner
Department of Environmental Quality
Engineering
Commonwealth of Massachusetts
100 Cambridge Street
Boston, Massachusetts 02202

Dear Commissioner Cortese:

Inclosed for your use is a copy of the Report on Lake Saltonstall Outlet (MA-00164). During the field inspection and the early stages of the preparation of this report, our contractor found that this dam had a "low potential hazard" for downstream damage in the event of a failure. Based on this finding, we directed our contractor to terminate his work and summarize the work accomplished to date. The report inclosed is a copy of this summary.

Sincerely,

Incl
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JOE B. FRYAR
Chief, Engineering Division

CF: Mr. Gould
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